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FEBRUARY 4, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Slow But Subtle

See Page 70

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MEDICINE

ACTH Relieves Asthma

➤ COMPLETE disappearance of all signs and symptoms of asthma within 48 hours after treatment has been achieved in four patients by ACTH, the pituitary gland hormone which has become famous as an anti-arthritis drug.

Two other asthma patients were helped but did not get such complete relief from ACTH. The results in the six cases are reported by Drs. Bram Rose, J. A. P. Pare, K. Pump and R. L. Stanford of the McGill University Clinic and the Royal Victoria Hospital, Montreal, Canada, in the CANADIAN MEDICAL ASSOCIATION JOURNAL (Jan.).

"The very limited quantities of ACTH which are available make it unlikely that this preparation will be available for therapeutic use (treatment)," the physicians state.

Their use of it was primarily an investigation made in an effort to study the mechanisms of hypersensitivity, or allergy, particularly asthma, in man.

Though the number of patients treated was small, the doctors feel they were of value as test cases because they were the most severe which could be found and they had not been having periods in which the asthma got better for a time without treatment. Of the six patients, five had had severe asthma for at least eight years and the sixth had it for three years. Their asthma was so severe that they had had to take medicines for it daily for at least three years. For the four who got complete relief through ACTH, it was the first time this had happened in five years, according to the patients' own statements.

Because they did not need adrenalin or other drugs while getting ACTH, the pulse rate slowed down and the patients felt well and their appetites improved. Cough and expectoration when present before ACTH treatment disappeared in three patients. In a fourth the amount of sputum raised daily was reduced from around a quart to about half a pint. Lung function as measured by vital capacity and maximum breathing capacity was improved. In one patient inhaling a grass extract brought on severe asthma before ACTH, but after ACTH, it induced only mild changes in breathing function without signs of asthma.

One patient remained completely free of symptoms for one month after the treatment, but the doctors say it is too soon to say how long the relief from asthma may be expected to last. ACTH was given by injection into the muscles every six hours for four to six days.

The mechanism by which ACTH produces temporary relief of asthma is not known. Skin test reactions were not changed. The doctors reason, therefore, that the combination of antibody with antigen may still occur, but that the ACTH has reduced the sensitivity of smooth muscle tissue. Consequently the chemicals released when the antigen, such as a pollen or food, reacts with antibody formed in the body do not produce symptoms.

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MEDICINE

Weapon Against Leprosy

➤ A NEW way to use an old drug may provide a cheap, effective weapon against leprosy. The drug is diamino-diphenyl sulfone, first synthesized in 1908. Good results with its modern use are reported by Dr. John Lowe, research director of the Nigerian Leprosy Service, in the LANCET (Jan. 28), medical journal published in London.

The drug was formerly thought too toxic to be given to humans. But, Dr. Lowe reports, it is perfectly safe when given by mouth, starting with a small daily dose and gradually increasing the size of the dose.

Of 50 patients treated, 72% improved, 62% showing improvement by bacteriological tests. In the remaining patients, the disease was arrested.

Most important from the standpoint of treatment of thousands of poor natives afflicted with leprosy, Dr. Lowe states, is the low cost of the drug, amounting to one or two dollars per year. The daily cost of treatment with this drug is only one-twentieth that of treatment with the proprietary sulfones such as promin, diasone and sulphetrone.

Possible importance for the drug in the treatment of tuberculosis is also suggested by Dr. Lowe.

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AERONAUTICS

Lives Lost Because Planes Not Crash Proofed

➤ THE "crashworthiness" of today's commercial airlines is inadequate. Many lives are lost that would have been saved if the proper equipment had been provided in the planes, according to William I. Stieglitz, design engineer of the Republic Aviation Corporation.

Safety belts in use now are not strong enough, seat structure often contributes to crash deaths and baggage is often not properly stored away, Mr. Stieglitz contended at a meeting of the Institute of the Aeronautical Sciences in New York which was devoted to safety.

He pointed to cases in which passengers who might have escaped from a crashed plane were wedged in by baggage or were prevented from reaching exits because seats and other cabin equipment had been strewn about the passenger compartment.

If adequate crashworthiness had been built into commercial airliners during the 11 years between 1938 and 1949, Mr. Stieglitz figured, there would have been a reduction of 25% in the total number of airline fatalities.

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AERONAUTICS

Pilot Ejection-Seat Limit Determined by Rocket Sled

➤ THREE hundred-pound dummies are being used at Edwards Air Force Base, Calif., in tests at speeds up to a thousand miles per hour to determine the limits of ejection seats for pilots on speedy jet planes.

The jet seats have already proved successful in tossing a pilot clear of a plane at a speed of 555 miles per hour. The tests will show if they can be used with higher speeds. If not, other types of ejection will have to be developed.

At very high speeds a pilot forced to abandon plane cannot jump clear of the aircraft's after parts as can be done at ordinary speeds. The ejection seat and the pilot are thrown high into the air above the plane where he becomes separated from the seat by automatic devices. He and the chair descend separately to the earth in safety by means of parachutes that open automatically.

The device used to acquire high speeds for the ejection tests is a sled which glides along a two-mile railroad track. A maximum of 15 rockets of the 10,000-pound type propels the 2,300-pound sled at speeds ranging up to 1,100 miles an hour. Rockets in reverse slow the sled down before it reaches the end of the course.

The testing equipment is a development of the Air Force at its Wright-Patterson field, Ohio, and Northrop Aircraft, Inc., Hawthorne, Calif. From tests already made it is expected that the present seat will be satisfactory at speeds up to 700 miles an hour, according to Air Force officers. If not satisfactory at higher speeds, research will be conducted to either improve the present type or possibly combine it with the complete escape capsule now being developed.

Various Navy and Air Force catapults are being tested. Among them will be one that will eject the pilot through the floor of the plane, instead of through the opening from a released overhead canopy. This, it is believed, will improve a pilot's chance of survival because there is no chance of his getting in contact with the plane's tail surfaces.

Science News Letter, February 4, 1950

MEDICINE

Flu Conquest May Be Near

Terramycin, the first antibiotic holding promise for 'flu treatment, may prove to be a remedy for it. Vaccines have hitherto been most promising agents against 'flu.

➤ THE chemical conquest of influenza may be near. A drug that "appears" to check infection of the chick embryo by one strain of influenza A virus has been discovered.

Terramycin is the name of this drug. It comes from an earth mold related to the one that produces streptomycin. The "terra" part of its name means earth. It was discovered and tested by the following scientists at Chas. Pfizer and Company Research Laboratories, Brooklyn, N.Y.: A. C. Finlay, G. L. Hobby, S. Y. P'an, P. P. Regna, J. B. Routien, D. B. Seeley, G. M. Shull, B. A. Sobin, I. A. Solomons, J. W. Vinson and J. H. Kane. They report their new drug in the journal, SCIENCE (Jan. 27).

Whether this new drug actually will prove a remedy for influenza in man will not be known until much more work has been done. It took "high concentrations," in other words, large amounts to check the 'flu virus in the chick embryos. This may not be a handicap, however, for in animals it is reported to show "a low degree of toxicity." This may mean that it is as safe as other antibiotic drugs.

So far, this is the first antibiotic drug showing promise as a remedy against influenza. Some of the others are able to check infections with larger-sized virus germs, such as those of smallpox. But the influenza virus is a small one.

Vaccines have heretofore been the most promising agents for stopping influenza. Their value has been limited, however, by the fact that there are several strains of influenza viruses. The first anti-influenza vaccines were not effective against all the viruses. Another disadvantage of vaccines is the speed with which 'flu spreads. The vaccines must be given somewhat before exposure to the virus, and their effect does not, so far as known, last indefinitely. This matter of timing has somewhat limited practical use of the vaccines.

Terramycin is effective, both by mouth and injection, against a number of other germs, tests on animals have shown. These include hemolytic streptococci, germs of a number of intestinal infections and some rickettsia, which are the kind that cause typhus fever among other diseases.

Science News Letter, February 4, 1950

MEDICINE

New Pain-Killing Drugs

➤ FIVE new pain-killing drugs are announced by Drs. D. W. Adamson and A. F. Green of the Wellcome Research Laboratories, Beckenham, Kent, in the British scientific journal, NATURE (Jan. 21).

They are "as active as morphine" the scientists state on the basis of rat experiments. So far, they have not been tried on human patients. Compared with amidone, another of the new synthetic pain-killing drugs, larger doses are required to stop pain in dogs. But the five new drugs do not produce the vomiting or other stomach and intestinal disturbances of amidone and morphine, the scientists report.

Chemically, the new drugs are called amino-butenes. They are an entirely new and rather unusual type of chemical with "surprising activity," according to one authority on pain-relieving drugs.

They are apparently the first chemicals in which a sulfur-containing ring has shown pain-relieving qualities. Chemists and pharmacologists will also find it unusual that chemicals with a double bond in their straight chain, such as these have, show pain-relieving qualities. In previous efforts to produce morphine substitutes, the double bond, or unsaturated straight chain, has usually been accompanied with a decrease in pain-relieving quality.

Whether these new drugs will prove to have addiction qualities does not appear in the report of the work so far. A drug as powerful as morphine without its ability to cause addiction has long been the goal of chemists and pharmacologists.

The new chemicals also have considerable anti-histamine activity, as well as ability to check spasms and to act as local anesthetics.

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GENERAL SCIENCE

Science Foundation Bill May Pass House Feb. 13

➤ CHANCES for final passage of the National Science Foundation bill this year look good to the scientists turned lobbyists who have been pushing the measure for the past four years.

Chairman Robert Crosser (D.-Ohio) of the House interstate and foreign commerce committee plans to try to bring the bill directly to the floor on Monday, Feb. 13, by-passing the rules committee which has pigeonholed the measure since last session. Stricken with fumes from coal in his home, Mr. Crosser was prevented from being on the floor earlier to bring up the bill.

The bill would set up a foundation of 24 members charged with promoting basic research in the various sciences and with coordinating the scientific activities of the government. Its operation is expected to cost about $15,000,000 the first year.

The bill has the support of most scientists, although they generally deplore an amendment requiring a loyalty affidavit from persons who receive funds under the bill. They contend such safeguards are not necessary for basic research in non-military fields.

However, scientists will accept the loyalty affidavit provisions of the bill in order to get the long-hoped-for foundation going.

Since 1946, the Senate has four times passed a Science Foundation bill, the House once. In 1947, a bill passed both Houses but was vetoed by the President because he objected to some administrative features.

Last year, during the first session of the 81st Congress, the Senate passed a Science Foundation bill, and a similar bill was approved by the House interstate and foreign commerce committee. However, it was held up by the rules committee.

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ELECTRONIC TORCH—Dr. J. D. Cobine of the General Electric Research Laboratory melts a quartz rod in the flame of an electronic torch so hot that it will melt firebrick and tungsten, the latter of which melts at 3370 degrees Centigrade. The flame consists of nitrogen being passed through a high-frequency arc.

ENGINEERING

New Clutch Evaluated

➤ MAGNETIC-FLUID clutches for automobiles and other types of applications have many advantages and also some weaknesses that must be overcome by further development, the American Institute of Electrical Engineers was told in New York by A. J. Parziale, Watertown Arsenal, N. Y., and P. D. Tilton, of Vickers, Inc., St. Louis.

The magnetic-fluid clutch is a development of the National Bureau of Standards, Washington, D. C. It utilizes oil containing iron powder. The preferred mixture is carbonyl iron powder in a light oil. The oil-iron mixture fills the gap between the faces of the clutch. When these faces are magnetized, the mixture "freezes" or solidifies when the iron particles cling together under the influence of the electric field. Power transmission is controlled by changing the magnetic field strength.

The advantages of a magnetic-fluid clutch for use in servo-mechanisms, Messrs. Parziale and Tilton stated, are its small size, simplicity, fast action, freedom from wear, smoothness, and a large ratio of output power to control signal power. Servo-mechanisms are devices used in the automatic control of many types of mechanisms, including some employed on airplanes.

The investigations of magnetic-fluid clutches reported at the meeting were made at the Massachusetts Institute of Technology under the sponsorship of the U. S. Air Force. Concern centered about servo-mechanisms rather than the ordinary automobile clutch.

The experimenters reported that the iron-oil mixture "must be able to withstand operation at temperatures as high as several hundred degrees Fahrenheit for long periods of time, and the fluid properties must prevent packing or settling of the iron powder into a dense, hard-packed mass during periods of storage or inactivity. This condition may be alleviated by the use of a wetting agent and a warm-up period of operation to stir the mixture." Other weaknesses were described, together with possible remedies.

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AERONAUTICS-SAFETY

Aircraft Fire Prevention Is Investigated

➤ FIRE prevention in aircraft is the subject of extensive scientific research, it was indicated at the meeting of the Institute of the Aeronautical Sciences in New York by experts from the U. S. Civil Aeronautics Administration and the National Advisory Committee for Aeronautics.

The CAA representative was H. L. Hansberry of the agency's experimental station, Indianapolis, Ind., and for the NACA, the speaker was L. A. Rodert of the Lewis Flight Propulsion Laboratory, Cleveland, Ohio. The first outlined progress in fire prevention in flight. The second reviewed forward steps in fire prevention following a crash.

Aircraft fire prevention work being carried on at Indianapolis now, and during the past 12 years, was reviewed by Mr. Hansberry. Activities cover a wide range, from fuel dumping tests during flight to facilitate emergency landings to jet power plant fire tests to provide basic data for improved fire prevention and fire protection means for aircraft powered by turbo-jets and turbo-props.

Other activities have to do with the development of fire-resistant coatings for doped fabric aircraft surfaces, aircraft fire detectors, and fire extinguishing agents. Important is the need for non-flammable hydraulic fluids which are utilized in control of aircraft mechanism.

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Question Box

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ARCHAEOLOGY

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ASTRONOMY

How large are some of the explosions on the sun? p. 71.

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What are the two diseases in which ACTH has most recently proved its effectiveness? p. 66, 70.

What drug promises hope in the conquest of influenza? p. 67.

What is the old drug now being used against leprosy? p. 66.

PHYSICS

How might the hydrogen bomb be successfully set off? p. 69.

Photographs: p. 67, General Electric; p. 69, British Museum of Natural History; p. 71, General Electric; p. 74, Dave Lutes; p. 75, National Advisory Committee for Aeronautics.

● RADIO

February 11, 1950, 3:15 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. William B. Heroy, geologist of Dallas, Texas, and President of the American Geological Institute, and Dr. David Dolo, Executive Director of the American Geological Institute, Washington, D. C., will discuss "Geology at Work."

Army teams are testing *plastic* snow shoes, sleds and packboards this winter; low cost, light weight and weather-resistance are the supposed advantages.

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PHYSICS

Hydrogen Bomb Question

The bomb would be a mixture of the fission bomb, the new deuterium superexplosive and other atoms which will transmute and yield energy at almost sun-heat.

➤ FOR 15 years science has had good evidence that there might be great energy, and very sudden, gigantic energy, in the coming together of atoms of the heavy or double-weight sort of hydrogen.

That is the basis of the so-called hydrogen bomb that has the world jittery. So far as known, this bomb has not been built or exploded. It is a possibility, just as in 1939 when the fission of uranium was discovered, the uranium bomb became a possibility.

The success of the fission bomb, the kind that the United States has and the USSR presumably has, makes the hydrogen bomb more likely. Because very high temperatures, such as those that occur in the fission bomb explosion, will be necessary to set off the hydrogen bomb, if it can be made to let "go."

Secrecy surrounds the hydrogen bomb, here and abroad, but it would not be realistic to conclude that top-level scientists are neglecting this research. It should be top priority at Los Alamos and other Atomic Energy Commission laboratories. Obviously there is little real publication on this new bomb, which theoretically could live up to its rumored reputation of being a thousand times as powerful as the conventional atomic bomb.

But back in the pre-atomic days as long ago as 1935, the equations of nuclear change and energy released were published in such journals as the PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON, Germany's NATURWISSENSCHAFTEN and America's PHYSICAL REVIEW.

This research shows that it should be possible for two atoms of deuterium, the hydrogen of mass two discovered in America in 1931, to come together and change into a proton (that is a heart of ordinary hydrogen atom mass one) and a triple-weight hydrogen (tritium) atom of mass three. Energy is given off, which is important.

The equations also show that two atoms of deuterium could come together to form a helium atom of mass three plus a neutron, which will be recognized as the non-charged atomic particle that triggers the fission atomic bomb. Again energy is given off, and the amount can be figured out rather closely, expressed in electron volts which is the way the scientists figure. It is a very tidy amount.

The catch is whether the hydrogen bomb could be set off successfully, but the best guess is that an ordinary uranium or plutonium bomb could be used to trigger it or "light" it.

The superbomb would therefore be a mixture of the now conventional fission bomb and the new deuterium superexplosive, with whatever kinds of atoms thrown in that recent and secret research may have shown will transmute and yield energy at the almost sun-heat created. One can guess that plutonium deuteride might be a good compound to use, since that might be a solid easier to handle than the deuterium which alone is a gas.

It sounds rather simple and logical, but there are undoubtedly many difficulties that would be encountered. If the scientists were apprehensive at the first test of the uranium bomb, in 1945, afraid that it either might not explode or would be more powerful than they expected, it is not difficult to imagine how they will feel if the hydrogen bomb is ever ready for test.

American scientists and officials are obviously not telling what they know or what they are doing. Everything in this article could have been guessed at just as well just after the U. S. atomic bomb was made known at the end of the war—except this fact: The Soviet scientists have their atomic explosion, too. We must not discount that Soviet scientists must be working on the hydrogen bomb, using the common store of prior atomic knowledge about deuterium and the energy that should be obtained from it.

There are other possibilities of atomic energy among the light elements. Hydrogen is the fuel of the sun. The universe is stoked by the use of the conversion of mass into energy. Dr. Hans Bethe, now at Cornell, worked out what is called the "carbon cycle," a six-step change of atoms that results finally in hydrogen being changed into helium, with production of positrons (positive electrons) and lots of energy. This happens, presumably, in the sun, where the temperature is a million degrees or so. This happens relatively slowly, as can best be judged, and carbon, nitrogen and oxygen atoms are used and replaced in the process. It is not the same process as that visualized for the superbomb of heavy hydrogen.

But scientists must wonder whether it might not be made to happen here on earth, since the fission bomb does create great heat, just how much has never been announced. Perhaps it is enough to speculate on the hydrogen bomb which presumably would explode and once its fury was spent would subside in a fraction of a second. The atomic energy process in the sun goes on continuously, which would not be a good thing to have happen on earth.

To those worrying about the uranium supply: There is probably more heavy hydrogen than uranium here on earth.

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HOW OLD?—Small samples are drilled from the skull bones of "Piltdown Man" (Eoanthropus dawsoni) preserved in the Department of Geology, British Museum. A fluorine content test was then run on the samples in order to determine age. The first stages of this test have proved fairly conclusively that the jawbone and associated braincase are contemporary, probably dating from the end of the last interglacial period, said by some scientists to be within the magnitude of the last 50,000 years.

MEDICINE

ACTH Curbs Gout

➤ HOPE that ACTH, the anti-arthritis pituitary gland hormone, may have real practical value as a treatment for gout appears in a report to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Jan. 28).

A single dose of the hormone injected into the muscles stopped a 49-day attack of gout within one hour and 15 minutes, Drs. H. M. Margolis and Paul S. Caplan of Pittsburgh report.

The patient, a 59-year-old man, had been disabled for seven weeks and suffered "violent" pain for four weeks. The usual treatment for gout had not helped and the pain could be controlled only by large doses of the pain-relieving drugs, demerol and codeine.

A second patient who had been in pain for five weeks and a complete invalid for one week recovered within one hour after a single injection of ACTH.

A third patient, just beginning to get about with a cane after a six weeks' bout with gout, got two injections of ACTH, with recovery except for slight stiffness in one knee within 24 hours.

The fact that ACTH stops the acute gouty attack with only one or two doses is "of considerable practical importance," the physicians point out. This means that patients with gout can be treated without worry over possible dangers from side effects such as may be a problem in ACTH treatment of rheumatoid arthritis which must continue for a long time.

The drug may not prevent later attacks of acute gouty arthritis, but these presumably could again be swiftly stopped by another injection of the hormone. It may be possible, it is suggested, to prevent a rebound of gouty symptoms after stopping ACTH by giving the usual gout medicines, colchicine and salicylates.

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AGRICULTURE

Seed Fights Indian Hunger

➤ HYBRID corn seed is on its way from America to India to fight starvation in India. American farmers get the equivalent of an extra harvest every four years from hybrid corn. Increased crops for India are in prospect if the seed shipment gives expected test results.

American hybrid corn seed has already been tested in Europe during the last three years, but this is the first shipment to India.

Officials of the Food and Agriculture Organization expect that it will take about three years of test planting before imported hybrid seed can be grown on a large scale. India has a flourishing corn industry of its own, but the hybrid technique is not used.

Hybrid corn has higher vigor than regular corn and gives increased yields of 25% to 30%. On the basis of the experience of corn scientists in this country, it will take India about 10 years to develop its own hybrid corn industry.

The present shipment of experimental seed is intended to help India close the hunger-gap with imported corn types, until she can develop her own hybrid corn.

To do this the FAO is shipping 36 different types of hybrid corn. They run the complete range of maturity types, from very early ripening to very late ripening corn. Testing these types at 25 experiment stations all over the country, the Indian scientists will learn which type will thrive best in each region.

As soon as this is known, India will be able to import the needed seed, and plant it to best advantage. Meanwhile Indian crop experts will be at work trying to develop their own native hybrid varieties.

After three years of similar testing of American types in Europe, Germany, Italy, and France are now seeking large-scale seed shipments. The only drawback at the moment is the shortage of dollars to finance the seed.

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AGRICULTURE-CHEMISTRY

Chemical Weed-Killer Stages Comeback

➤ THE weed-killer, IPC, which has had its ups and downs in the good opinion of agricultural scientists since it was first hopefully heralded in 1946, is slowly making a comeback as a herbicide of promising although limited uses.

Pasture trials conducted in Davis, Calif., and in the Sacramento Valley by the University of California College of Agriculture show that IPC can control some perennial weed grasses in plots of Ladino clover if applied when the weed is still a seedling. It was with such perennials as quack grass and Bermuda grass that IPC had proved a disappointment in earlier trials.

IPC (short for isopropyl N phenyl carbamate) has also given good control over certain annual weed grasses like rye, wild oats, and foxtail, said Dr. Luther G. Jones of the college experiment station. He emphasized, however, that the work is still experimental and the results are only tentative.

For best weed control, Dr. Jones found that rainfall conditions must be just right. Too little rain fails to carry the solution to the roots, and too much carries it away.

Like the widely used weed-killer 2,4-D, IPC is a chemical which is very similar to natural plant hormones. Although they affect different plants differently, they both have a growth-regulating effect which is powerful enough to kill plants.

As recently as last August the U. S. Department of Agriculture announced that IPC has not been a commercial success.

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PHYSICS

Radioactive Materials Mark Routes of Birds

➤ CHALK up another victory for atomic energy. A product of the atomic pile, secreted in a man's pocket, could make a record of the exact time he returned to his home at night.

It has not yet been used for this purpose, but it has been used in homing experiments with wild birds, the American Association for the Advancement of Science was told by Prof. Donald R. Griffin of Cornell University.

Wild birds were "tagged" with a small and harmless amount of a radioactive material which was placed in an aluminum capsule attached to the ordinary bird band. A recording instrument near the nest of a bird was activated by the radiation from the material whenever the bird returned to his home.

Other applications were suggested by Prof. Griffin, such as the tagging of animals in ecological and behavior studies. It would enable, he said, the movements of aquatic and burrowing animals under water or ground to be traced. Methods and formulae were given by him for calculating the quantities of radioactive isotopes that may be safely attached to animals and the range at which a given tag may be detected by available instruments.

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On This Week's Cover

➤ THE mild and comical looking slow loris has a dazzling change of pace that is death to its victims. It sleeps by day and hunts by night. It stalks at a snail's pace "imperceptible and silent as the shadow on the dial." Once beside its unwary prey, the loris kills it with a lightning thrust of its hands. That is how it behaves in its native Malay jungles where it takes its toll of birds and insects. At the National Zoo in Washington they feed it bananas, which may explain the petulant look. The grasping hands and feet mark the slow loris as one of man's closer kinsmen, down below the monkeys in the primate scheme of things.

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ASTRONOMY

Sun's Explosions Still Tops

The hydrogen bomb would be a mere firecracker in comparison to the explosions on the sun. Some of them are several hundred thousand miles across.

➤ ANY atomic superbomb that could be constructed on the surface of the earth is a mild firecracker in comparison with tremendous explosions in the atmosphere of the sun, Dr. Donald H. Menzel, associate director for solar research of the Harvard College Observatory, declared.

"Some solar explosions have a mushroom cap twice as big as the earth," Dr. Menzel said. "Some are several hundred thousand miles across. There are, however, no atomic explosions going on in the sun's atmosphere. While some eruptions seem to take the shape of an earthly atomic bomb, there is no direct connection between them and hydrogen and uranium bombs."

Dr. Menzel spoke as guest of Watson Davis, director of Science Service, on the nation-wide Columbia network.

The sun's pearly halo can be crumpled by weight of great luminous clouds of gas, Dr. Menzel announced.

Our brilliant displays of northern lights, or aurora borealis, are probably caused by clouds of gas striking the earth, after having been shot away from the sun, Dr. Menzel explained.

Motion pictures taken at Climax, Colo., more than two miles high in the Rockies show that these prominences or luminous clouds represent the denser portions of the sun's atmosphere. They are compressed by the sun's magnetic field and fall to the sun. Some matter descends invisibly, and this may be the material that shines dimly in the sun's corona.

"The corona is a sort of halo that surrounds the sun and usually shows the characteristic pattern of the sun's normal magnetic field," said Dr. Menzel. "Some photographs of the corona from Lick Observatory, California, show a very close relationship between the faint corona and the brighter prominences. In one particularly striking instance, the corona appears crumpled and bent under the weight of a specially large prominence."

Variations in the sun's output of radiation cause disturbances in the upper earth's atmosphere, disturbances that affect and sometimes completely interrupt radio communications, especially on the short waves.

Science News Letter, February 4, 1950

AERONAUTICS

Rocket's Tail-Piece Found

➤ A NEARLY-INTACT tail section of the "Wac Corporal" rocket that reached an altitude of 250 miles has recently been recovered at the White Sands, N. Mex., proving grounds, the Army Ordnance Department revealed in Washington, D. C.

The rocket was shot in February, 1949. No remains of it have been previously found. This tail section was found near the north end of the 116-mile range. It is now undergoing tests at the Jet Propulsion Laboratory of the California Institute of Technology in attempts to ascertain more fully what happened to it in its flight.

Cal Tech and the Douglas Aircraft Company collaborated with General Electric, as contractors for the Ordnance Department, in the launching of this rocket, known as the Bumper, which reached the highest altitude ever attained as far as known.

The rocket was a two-stage affair. It consisted of a German V-2, with a 700-pound, American-built "Wac Corporal" rocket attached to its nose. At a height of about 20 miles, the smaller rocket separated from the German affair and sped away at a speed of 5,000 miles an hour.

Failure to find parts before were attributed to the belief that the heat and shock produced by the rocket's re-entry into the atmosphere would cause its parts to disintegrate into tiny particles.

Science News Letter, February 4, 1950

THE SKY'S THE LIMIT—The electrical device, a Switchette, which Mrs. Dolores Mohlman of Schenectady holds in her right hand, has soared 250 miles above the earth—higher than any other man-made article. In her left hand is a model of the two-stage rocket of which the Switchette was a part.

AGRICULTURE

Poor Handling Devalues Grade A Eggs

➤ THE hen does its part, delivering mostly Grade A eggs, but poor handling by the poultryman or the producer causes at least a third of the nation's eggs to be downgraded to lower ratings.

Too long a time lag between laying and marketing is one cause of downgrading. Rough or careless usage causes stained, dirty, cracked, or leaking eggs, all of which results in demotion down in the grade scale.

Although a third of the nation's eggs have already fallen below Grade A, a Department of Agriculture study shows that there is a sharp variation in quality between individual producers. In some cases almost all eggs will be graded in the top category, while other poultrymen may have as little as 5% Grade A's.

One aim of the Department's study is to learn ways to help farmers improve egg quality.

Science News Letter, February 4, 1950

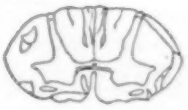
DIRECTIONS: Four possible answers are given for each question. Put an × in the parentheses in front of the number corresponding to that answer which you think is **most nearly correct.**

PART A

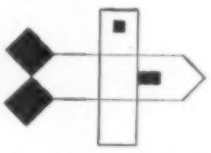
1. Which of the following diseases is most likely to be spread by rats?
   ( ) 1. rabies
   ( ) 2. Rocky Mountain spotted fever
   ( ) 3. tularemia
   ( ) 4. typhus

2. Which of the following is *least* related to the other three?
   ( ) 1. imaginaries
   ( ) 2. powers
   ( ) 3. roots
   ( ) 4. soils

3. This diagram is most likely to be found in a book on
   ( ) 1. botany
   ( ) 2. ethnology
   ( ) 3. lepidopterology
   ( ) 4. neurology



4. Which of these three-dimensional figures can be made by folding the pattern?



( ) 1.
( ) 2.
( ) 3.
( ) 4.

5. In which field of knowledge is the term *artifact* used most?
   ( ) 1. archaeology
   ( ) 2. neurology
   ( ) 3. ornithology
   ( ) 4. pomology

6. A stroke of lightning which hits an airplane flying through a thunderstorm usually
   ( ) 1. does little damage to the plane
   ( ) 2. does major damage but does not wreck the plane
   ( ) 3. puts the radio out of commission
   ( ) 4. wrecks the plane

7. Of the following birds, which one's diet is made up in largest proportion of insects?
   ( ) 1. blackbird
   ( ) 2. bluebird
   ( ) 3. crow
   ( ) 4. sparrow

8. The symbol ! after a number indicates that it is a factorial. Thus 4! equals 4 X 3 X 2 X 1. Which of the following equals 5?
   ( ) 1. 5!
   ( ) 2. 5! - 4!
   ( ) 3. $\frac{5!}{4!}$
   ( ) 4. 5! X 4!

9. Hemophilia is a disease which
   ( ) 1. can be cured by repeated injections of morphine
   ( ) 2. occurs in the males, but is only transmitted through the females
   ( ) 3. occurs more frequently among Negroes than Caucasians
   ( ) 4. produces sterility in males

10. The number of named constellations is approximately
    ( ) 1. 60
    ( ) 2. 90
    ( ) 3. 120
    ( ) 4. 150

11. An adult person accurately described as *leucomelanous* would most likely be found
    ( ) 1. as a member of the Caucasian race
    ( ) 2. in a mental hospital
    ( ) 3. in a stupor
    ( ) 4. living in the Antarctic regions

12. One of the best methods so far found for measuring the temperature of the exhaust flame of a rocket is
    ( ) 1. a silicon pyrometer
    ( ) 2. an absorption-emission pyrometer
    ( ) 3. an ultrasonic variator
    ( ) 4. sodium line reversal

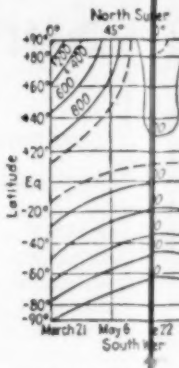
13. A contingency table is similar to a correlation table, but one of the variables (and usually_____) is _____ instead of _____.
    Which is the correct order for the three missing words?
    ( ) 1. both — qualitative — quantitative
    ( ) 2. both — quantitative — qualitative
    ( ) 3. three — qualitative — quantitative
    ( ) 4. three — quantitative — qualitative

14. All rocks are divided into three major classes, according to mode of origin. Which of the following is not one of the three?
    ( ) 1. glacial
    ( ) 2. igneous
    ( ) 3. metamorphic
    ( ) 4. sedimentary

SCIENCE APTITUDE TEST—This sample contains typical questions taken from the original three-hour examination given to high school seniors in the Ninth Annual Science Talent Search conducted by Science Clubs of America, administered by Science Service. The test was devised by Dr. Harold A. Edgerton, and Dr. Steuart Henderson Britt, psychologists of New York City. If you wish to take this test arrange to spend about 35 minutes of uninterrupted time. Then turn to page 76 for the answers. If you wish to see the complete aptitude test used, send two three-cent stamps to Science Service, 1719 N St., N. W., Washington 6, D. C. and ask for the science talent test.

PRINT IN BINDING

SECTION E: Tidia
cal cm^{-2} day^{-1} re
of an atmospher



QUESTIONS FOR CT

64. During the r
the maximum
for by the
( ) 1. decli
( ) 2. ice
( ) 3. leng
( ) 4. soil

65. The total radi
sphere during
amount rece
its summer.
fact that
( ) 1. dur
( ) 2. few
( ) 3. the
( ) 4. the

66. Assuming a
conditions at
of insolation
that one day?
( ) 1. 144
( ) 2. (12
( ) 3. (.39
( ) 4. (80

DIRECTIONS: Fo
tions 101 and 102.
the number corres
is **most nearly cor**

101. If all M is P,
( ) 1. all
( ) 2. all
( ) 3. all
( ) 4. no

102. If no M is P,
( ) 1. all
( ) 2. all
( ) 3. all
( ) 4. no

Some microbes
plants. Other micr
animals. Write the
of the following

( ) 103. amoeb
( ) 104. bacter
( ) 105. ciliate
( ) 106. flagell
( ) 107. molds
( ) 108. spiroc
( ) 109. sporo

GENERAL SCIENCE

Super-Quiz Tests Your Science Ability

➤ HERE'S a quiz that will tell you whether you have scientific ability. It is science's super-quiz of the year. This is part of a three-hour science aptitude test just taken by thousands of high school seniors.

These young scientists were competing in the Ninth Annual Science Talent Search for the Westinghouse Scholarships. Their papers are now being scored by the judges and the results will be announced shortly. Up to now, the questions have been kept secret.

This quiz is not easy. In fact, not even the most brilliant scientist would be expected to get all the answers right. But the questions do require the use of scientific aptitude, or the ability to think things through to a logical and successful conclusion.

Trying the test will give you some idea whether you have that scientific aptitude. Only a very small percentage of our population can do creative investigational work.

If you want to try the test, here's how you go about it. First, don't peek at the answers. Next, you need about 35 minutes of uninterrupted time. Finish all the questions in one sitting.

There are three kinds of questions. Follow the directions for answering the questions given at the top of each of the three parts.

You won't make a perfect score. The test is made quite difficult intentionally in order to eliminate the persons who do not have perseverance to finish a job.

You may start in on the test and then not finish it. That is your privilege. But the ability to finish what is started is a prime requisite for solving scientific problems.

The high school seniors were not required to take the test. They could walk out on it—and many of them did, thus withdrawing from the competition.

Doing well on this sample of the full test is creditable but it does not mean you can quit what you are doing and become a scientist. It takes many years of study to become a professional scientist besides native ability.

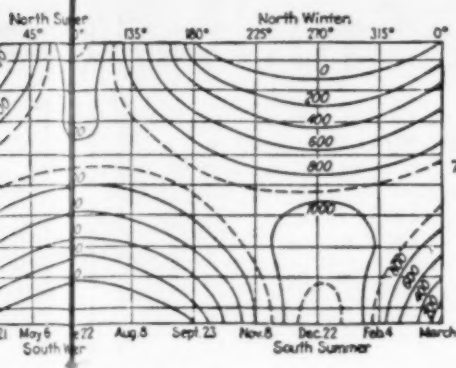
After you have completed the test—but not until then—look at the answers. Then score your answers right or wrong. The number right is your score.

Forty top Science Talent Search winners from all parts of the nation, who had to answer these questions and many more, will arrive in Washington March 2.

They'll meet President Truman and leading scientists and they will compete for thousands of dollars in scholarships. An additional 260 contestants are being given honorable mention and recommended to colleges, universities and technical schools. In 16 states additional prizes and scholar-

(Turn to page 76)

N E: T diagram shows the daily insolation in day⁻¹ re ved at the earth's surface in the absence mospher



NS FOR CTION E

g the n ern summer the North Pole receives aximum ly insolation. This might be accounted r the

1. decl ion of the sun's axis toward the earth
2. ice snow of that region reflecting more the sun's rays
3. leng of the Arctic summer day
4. soil hat area absorbing heat more rapidly

otal radi n received by the southern hemi- during southern summer is greater than the t rece by the northern hemisphere during nmer. Th probably best accounted for by the hat

1. dur the southern summer the earth is er the sun than during the northern mer
2. few servations of insolation are taken in th outhern hemisphere than in the n ern hemisphere
3. the thern summer is shorter than the s rn summer
4. the hern hemisphere contains less land more water than the northern

ing a 4 ss in insolation due to atmospheric ions at th uator on June 22, how many calories olation w reach an area of one square foot in ne day? m = .3937 inches)

1. $\frac{144 \quad (.60)}{(.7)^2}$
2. $\frac{(12 \quad 3937)^2 \ (800)}{.40}$
3. $\frac{(.39 \quad (.60)}{(1+ \quad (800)}$
4. (80) (.3937) (12)

QUESTIONS FOR SECTION I

78. If a given chemical compound can be purchased for $1.59 per pound with a 15% discount for purchasing in lots of 100 pounds or more, which is the solution to the purchase price for 111 pounds?

( ) 1. $(111 \top 1.59) \top (1.00 \bigtriangledown .15)$
( ) 2. $(1.59 \top 111) \perp (.15)$
( ) 3. $(1.59 \top .15) \top 111$
( ) 4. $111 \top 1.59 \top 15 \top 100$

PART B

79. What is the value of

$$[a^2 \bigtriangledown b^2 \bigtriangleup c^2 \bigtriangledown (a \bigtriangledown b)^2] \perp c^2 \quad ?$$

( ) 1. $(a \bigtriangleup b) \top (a \bigtriangledown b) \perp c^2$
( ) 2. $(a \bigtriangledown b) \top 2 \top b$
( ) 3. $c^2 \bigtriangleup 2 \top a \top b \perp c^2$
( ) 4. $1 \bigtriangleup (2 \top b) \top (a \bigtriangledown b) \perp c^2$

SECTION M: "As a result of the valiantly critical spirit which engendered the heresies, we have overcome the notion that mathematical truths have an existence independent and apart from our own minds. It is even strange to us that such a notion could ever have existed. Yet this is what Pythagoras would have thought—and Descartes, along with hundreds of other great mathematicians before the 19th century. Today mathematics is unbound; it has cast off its chains. Whatever its essence, we recognize it to be as free as the mind, as prehensile as the imagination. Non-Euclidean geometry is proof that mathematics, unlike the music of the spheres, is man's own handiwork, subject only to the limitations imposed by the laws of thought."

QUESTIONS FOR SECTION M

91. According to the paragraph, mathematical truth is

( ) 1. a structure of human imagination
( ) 2. an eternal verity
( ) 3. proven by non-Euclidean theorems
( ) 4. the product of heresy

92. Non-Euclidean mathematics is

( ) 1. a departure from the mathematics of Descartes
( ) 2. Pythagorean in character
( ) 3. prehensile and consummate
( ) 4. the basis for modern musical harmony

93. Mathematical truth is

( ) 1. an ideal toward which mathematicians strive
( ) 2. limited by logic
( ) 3. unlimited in scope
( ) 4. unreal and does not exist

NS: Fo sible answers are given for ques- nd 102. n × in the parentheses in front of correcting to that numbe which you think arly cor

M is P all S is M, then

1. all S
2. all S
3. all P
4. no P

M is P all S is M, then

1. all S
2. all S
3. all P
4. no P

icrobes A) are more like animals than er micr Class B) are more like plants than rite the A or B in the parentheses for each owing t ate which class it is.

amoeb
bacte
ciliat
flagel
molds
spiroc
sporoz

PART C

Nobel prize awards have been made in:

A. Chemistry
B. Physics
C. Physiology or medicine

Write the letters A, B, or C in the parentheses for each of the following names to indicate in which field the man was awarded a Nobel prize.

( ) 119. Erlanger
( ) 120. Fermi
( ) 121. Langmuir
( ) 122. Minot
( ) 123. Rabi
( ) 124. Urey
( ) 125. von Szent-Györgyi

Below are two lists. Each item in Column I is the name of an invertebrate. In Column II are listed the meanings of the names of these and other invertebrates. For each word in Column I, put the number of its meaning (from Column II) in the parentheses.

Column I		Column II
( ) 126.	Arthropoda	1. head-footed
( ) 127.	Cephalopoda	2. joint-footed
( ) 128.	Gastropoda	3. porous-bearing
( ) 129.	Mollusca	4. single-celled
		5. soft-bodied
		6. stomach-footed

AERONAUTICS

Big Winds Aid Aviation Study

Wind tunnels, prime tool in aerodynamics, contribute vital knowledge as to how planes will act in flight. All airplane design is based on such knowledge.

By A. C. MONAHAN

➤ EVERY forward step in aviation comes from lessons learned with wind tunnels.

Even the Wright Brothers, who flew the first man-carrying, engine-powered airplane, used a simple home-made wind tunnel to determine the behavior of a plane in air currents.

Wright Tunnel Was Crude

The Wright Brothers' tunnel was a crude affair measured in terms of the giant tunnels of today, but it might be called the daddy of American wind tunnels. It was described by them as a long square tube having a glass cover.

Actually, it was not quite as simple as that. It contained elements used today to break up air eddies and give a straight-away flow of air. Also the famous brothers developed instruments to use in connection with their tunnel. The original instruments are at the Franklin Institute, Philadelphia, but replicas are in the permanent exhibit at the Oberlin College, Ohio, Wilbur and Orville Wright Laboratory building.

In the Wright Brothers' setup, ordinary fan blades were used for air pressure. The fan was attached to a small bench grinder driven from the shop line shafting. It created an air current through the tunnel of 40 feet per second, as measured by an anemometer.

The metal spout that directed the air into the tunnel contained four "cross" baffles to break up circulatory motion. At the entrance to the tunnel was a metal grid of 100 square holes to straighten the flow. To still further break up any eddy currents, small areas of wire were attached to the front side of the grid. Somewhat similar devices are used in modern tunnels.

It is a long cry from this 40-feet-per-second "breeze" in the "daddy" tunnel, about 27 miles per hour, to one of today's tunnels through which air is passed at a rate equivalent to 3,960 miles per hour. This is more than five times the speed of sound, approximately 760 miles per hour at sea level. The tunnel in which this extreme speed was recorded is the famous German suction affair, a war captive now in use at White Oak, Md., in the laboratories of the U. S. Naval Ordnance.

World's Fastest Speed

Even faster in air speed is a new tunnel just put into service at the California Institute of Technology. It has an extreme speed ten times the velocity of sound, and it was designed especially to study the possibility of intercontinental missiles.

Not all wind tunnels are alike. Some are tiny affairs for use in a laboratory. Others are giant structures several hundred feet long and costing several millions of dollars. Most are horizontal tunnels but some stand upright on end.

Some circulate and recirculate the same air; others use the air but once. Some are for testing airplane models, but others are for testing rockets, bombs and cannon shell. Still others are for testing engines. In these days of supersonic speeds, turbojet engines, ram-jet engines and rocket engines, types of power plants and fuel must be developed for use at high speeds, low speeds, and in the rare atmosphere of the kind encountered miles high above the earth.

Basically tunnels of the horizontal type are alike in many respects. All use fans or giant compressors of the turbine type to drive quantities of air into the tunnel. Just before reaching what is called the test section, the air is allowed to expand to produce the desired speed in the test section.

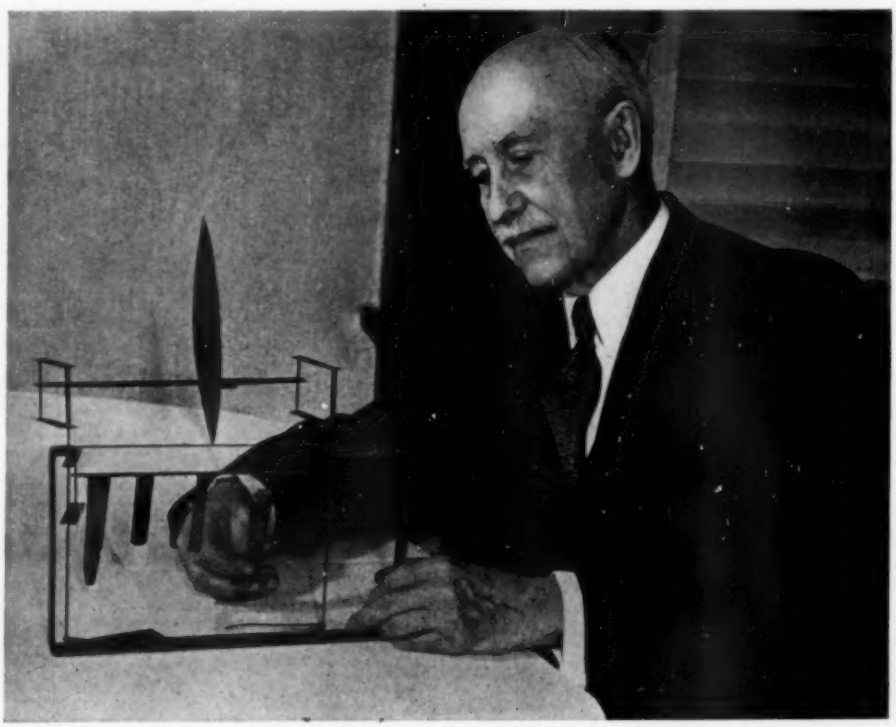
Moving into the minimum area of the tunnel throat, the air reaches high speed, and as the tunnel passage is expanded, is accelerated to its maximum speed. The test section is where models are suspended and where their action in the high wind current can be observed through glass windows.

Not only can the behavior of the model be noted, and recorded on motion picture film if desired, but the behavior of the air current itself can be studied. Scientists have developed instruments which make the air currents, eddies and turbulences created by the suspended model visible to the eye and subject to photography. It is the so-called Schlieren effect that becomes visible.

Circulatory vs. Straight-away

Probably the majority of wind tunnels used are of the circulatory type. That is, they are a tubular affair within which the air passes from the compressors to and through the test section and on to reach the turbines again and start on another circuit.

However, the German tunnel at White Oak is a straight-away, and it has no compressor. At its terminal is a 52-foot steel sphere. The air in the sphere is removed by vacuum pumps, the process requiring some ten minutes.



ONE OF THE FIRST—The late Orville Wright examines an early wind tunnel instrument devised by the Wright brothers.

PRESENT DAY TUNNEL—The size and shape of a large wind tunnel is shown by the NACA installation at Moffett Field, Calif.

When a test is to be made and the models are in place, a valve between tunnel and sphere is opened and the suction draws air through the tunnel. Only about 40 seconds are required to fill the sphere with the air drawn through. Forty seconds is, therefore, the testing time. To measure all the positions a missile will actually endure in flight means the running of many separate tests.

Turbojet Power for Tunnel

A new "straight-through" wind tunnel, recently put into service in England, utilizes a standard British turbojet engine to provide the wind current. It is a Rolls-Royce Nene, which gives a static thrust of 5,000 pounds and is widely used in jet planes of the Royal Air Force.

The engine is placed at the terminal end of the tunnel. It is housed in a nacelle carried in a bulge of the sidewalls. A space is left between the inner nacelle and the outer wall through which two-thirds of the tunnel air is drawn by the ejector action of the jet.

The remaining one-third of the air is drawn direct into the engine. When no model is in the working section, a rate of airflow nine-tenths the speed of sound can be obtained. One advantage of this tunnel is its low cost.

A new 3,500-mile-an-hour tunnel at Princeton University utilizes compressed air, rather than a vacuum. Air is put in a tank by the use of two 100-horsepower compressors, the operation requiring several hours. When wanted, this air can be discharged into the tunnel through a supersonic nozzle.

Tunnels Aid Plane Design

Wind tunnels have been called the number one tool in aerodynamics, the branch of science that deals with the physical effects of winds and wind velocities. All airplane designs are based on knowledge of this science, and most of the vital knowledge has come from wind tunnel research.

There are many wind tunnels in the United States and also in other countries leading in aviation. American tunnel research work is spear-headed in the three great laboratories of the National Advisory Committee for Aeronautics.

Equally valuable, however, is similar work in laboratories of the U. S. Air Force, the Navy, universities and the airplane industry itself. Research efforts these days are concentrated on designs and equipment for speed—looking forward to the supersonic speed age which we are now entering.

One of the newest and most up-to-date wind tunnels in the world is one that has just gone into operation at the Lewis Laboratory of the NACA at Cleveland, Ohio.

Primarily for engine testing, full-scale engines can be put in it and investigated under conditions simulating those to be found at altitudes as high as 80,000 feet. It is a tunnel of the non-returning-passage type to permit burning fuel and air in an engine under actual operating conditions. This new supersonic tunnel, eight by six feet in size, is the world's largest tunnel working in the faster-than-sound speeds.

PROJECTION LENS

An outstanding value presented by Harry Ross for the photographer who recognizes a good buy. Product of the Spencer Lens Co.: 3" focus, 13/16" clear aperture, 1⅛" O.D. This lens is air spaced and will not be affected by heat. Can be used on 8mm, 16mm, 35mm and double frame 35mm film sizes. A $9.50 value is yours for only..... $2.00 Postpaid

•

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Ideal for the study of minerals. Observe the colors of all fluorescent materials under the 250 Watt Purple X Lamp (Black Light). Why do white onions fluoresce a pink and the roots a snow white? Potatoes fluoresce a milky blue and the peelings are wholly negative. Good humus and snails castings can easily be detected. These results and many more are obtained under this same lamp. Minerals from different sources give off different responses. Order a BLACK light and three brilliantly fluorescent minerals for ONLY $2.00. Express charges collect.

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ASTRONOMY

Exploding Star Studied

➤ HUNDREDS of American telescopes are being trained on a new exploding star that has flashed to sudden brilliance in the northwestern sky.

Discovered in France Jan. 23, the first nova of the year is barely visible to the naked eye. It is reported sixth magnitude and American observations showed it was still of this brilliance three nights later. It should be picked up with binoculars or field glasses by those who use a star chart to tell it from more constant stars.

Harvard Observatory, receiving point for astronomical news from abroad, has alerted the big telescopes to obtain its spectrum of light. Amateurs skilled in estimating the brightness of variable stars have been urged to observe the nova and tell whether it is increasing or losing brilliance.

The nova is in the stellar constellation of Lacerta, the lizard. It is near the boundary of the bright constellation Cassiopeia, which appears as a large letter W high in the northwestern sky these winter evenings. To find the new star, trace a line starting with the central star in the W, gamma cass, extend it westward through the westernmost star of the W, beta cass, and prolong it about twice its own length. This will locate the new star. For astronomers, the location is right ascension 22 hours 48 minutes and declination north 53 degrees 2 minutes.

A nova is an obscure star that suddenly becomes tens or hundreds of thousands of times brighter. Usually the outburst lasts only a few days. A few months later it may fade to its original obscurity. Astronomers do not know the cause of such outbursts.

The new star will be called Bertaud's nova, since it was discovered by Astronomer Charles Bertaud of Meudon Observatory, near Paris. The same astronomer found another nova in another part of the sky last Aug. 1.

The present nova is the third to be found in the same constellation in the last 40 years.

Science News Letter, February 4, 1950

AERONAUTICS

Progress Reported in Atomic Power for Planes

➤ THE day when airplanes will be powered by atomic energy is coming closer, Maj. Gen. Donald L. Putt, U. S. Air Force, told the Institute of the Aeronautical Sciences in New York.

Considerable progress was made during the past year in research on the use of nuclear energy in planes, he said, but details cannot yet be revealed.

Outlining ten major fields of research and development in which the Air Force is engaged, the general termed 1949 as the year of decision for future propulsion of Air Force aircraft. He said that progress in aircraft gas turbine development and experience with jet aircraft have provided a reasonable basis for evaluating the various forms of propulsion for high speed combat aircraft now under design.

Science News Letter, February 4, 1950

AERONAUTICS

Canadian Jet Plane May Be Most Powerful Fighter

➤ A TWIN-JET fighting plane, just built by A. V. Roe Canada Limited and recently flight tested, is said to be the most powerful fighter of the world. It is a defense plane, designed for joint defense plans without duplicating aircraft manufacturing programs elsewhere.

The new craft is presently fitted with Rolls-Royce Avon engines, but Canadian-designed and built Avro Orenda turbojets will be used later. It carries a pilot and a radio-navigator. It has a wing spread of 52 feet, and is about 52 feet in length. The two jets are fitted close to the fuselage, and the plane has tricycle landing gear.

This Avro Canada fighter is designed to meet Canadian conditions in the defense of Canada. It is an all-weather, long-range craft. It is equipped with the latest navigational and operational devices to exploit these characteristics.

The plane is a product of the same company that designed and built the Avro Jetliner now undergoing flight tests. This is the only jet-propelled airliner yet constructed in the Western Hemisphere, although England has one in the air, and the United States has one or two "on the drawing board."

Science News Letter, February 4, 1950

From Page 73

ships are being awarded to state winners.

The full three-hour test was only a part of the talent search. In addition, each contestant filled out a personal data blank and wrote an essay describing some scientific project he had done or wishes to do. Teachers filled out a recommendation form and principals reported scholarship.

The science aptitude test was compiled by two of the Science Talent Search judges, Dr. Harold A. Edgerton, Vice-president of Richardson, Bellows, Henry and Company, Inc., New York, and Dr. Steuart Henderson Britt, Director of Personnel, McCann-Erickson, Inc., New York. Both are leading psychologists.

Taking the test and competing in the search comes as a culmination of high school science study and science club activity for thousands of boys and girls of America's public, private and parochial secondary schools.

Science Quiz Answers

Now that you've taken the science aptitude test, you are ready to check your answers.

Correct Answers to Part A are: 1, 4; 2, 4; 3, 4; 4, 1; 5, 1; 6, 1; 7, 2; 8, 3; 9, 2; 10, 2; 11, 1; 12, 2; 13, 1; 14, 1.

For Part B, Section E: 64, 3; 65, 1; 66, 1. Section I: 78, 1; 79, 4. Section M: 91, 1; 92, 1; 93, 2.

For Part C: 101, 3; 102, 4; 103, A; 104, B; 105, A; 106, A; 107, B; 108, B; 109, A; 119, C; 120, B; 121, A; 122, C; 123, B; 124, A; 125, C; 126, 2; 127, 1; 128, 6; 129, 5.

Your score is the number you answered correctly. If your score is 30 or better, you may have a real talent for science. Average science aptitude is indicated by scores ranging from 15 to 29.

Science News Letter, February 4, 1950

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ARCHAEOLOGY

Clue to Man's Ancestors?

➤ TWO tiny jaw bones picked up in Texas may contain a clue to the ancient ancestry of man and the other mammals. The bones are a 100 million or so years old, and date from a period 60 million years long during which dinosaurs and other reptiles ruled the earth and all trace of the warm-blooded mammals almost totally disappeared.

The bones which are about half an inch long were found by Dr. Robert H. Denison, curator of fossil fishes, and Dr. Rainer Zangerl, curator of fossil reptiles, both of the Chicago Natural History Museum. The two scientists were searching for turtle fossils, when Dr. Denison spied the first bone. Returning later, he picked up the second nearby.

The scientific world is especially interested in these finds because whole bones of mammals from this period, technically referred to as the Early Cretaceous, are extremely rare. There is ample evidence of dinosaurs and their reptile relatives, but very little clue to the warm-blooded mammals, the group to which man belongs.

The two bones are being studied by Bryan Patterson, mammal expert of the museum. They have been identified as jaws of an extinct little mammal known as a triconodont. This little animal was something like a mole, but actually it is considered to be so unlike any living animals that museum scientists intend to go back to the Texas site to see if they can find some other fossils which will form a link between man and the present-day animals and those of the ancient past.

The 60-million-year-long period from which the new finds date is something of an archaeological Dark Age. The period just before, and the period just after, are relatively rich in mammal fossils, from which ancient animal life can be reconstructed. But aside from a few teeth found previously in Wyoming, Montana, Mongolia, and southern England, scientists have had little clue up to now of how the ancestors of today's animals looked.

The bones will be put on display after they are carefully studied.

Science News Letter, February 4, 1950

STATISTICS

Nearly Half of Women in Who's Who Are Single

➤ ALMOST half, 40%, of the women in WHO'S WHO IN AMERICA are not married. And about the same proportion, 41%, of those who are married in the 40 to 74 year age group have no children.

These figures, showing a relatively high proportion of childless women and generally low fertility levels among the WHO'S WHO women, are reported by Dr. Clyde V. Kiser and Miss Nathalie L. Schacter of the Milbank Memorial Fund in New York.

WHO'S WHO women live in every state of the union, but the Northeast, Washington, D. C., Illinois and California have the largest concentration of these women.

Their median age is about 57. Only three per cent are under 35 and nearly 29% are over 65 years of age.

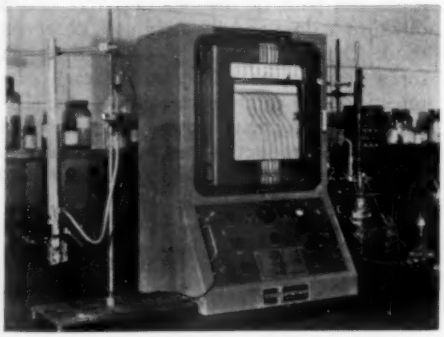
Nearly 23% are college presidents, deans, professors and other teachers. Almost the same proportion, 22%, are authors, including novelists, poets, playwrights, magazine writers and the like. Artists make up 7%, editors, reporters and columnists 6%, and public officials 6%. "Club women" constitute another 6%, actresses and dancers 5%, musicians and singers 4%, professional welfare workers 4%, political party workers 3%, business women 3%, librarians, excluding deans and professors of library science, 2%, religious workers 2%, and women in miscellaneous occupations the other 8%.

The total number of women in the 1948-1949 edition of WHO'S WHO IN AMERICA lists 2,409 women. This is only about 6% of all persons listed.

"If mention of this small proportion has a 'red flag' effect on the feminists," Dr. Kiser and Miss Schacter state, "we hasten to mention that the proportion was probably even smaller in the earliest edition and that it will probably increase in the future. Also, by virtue of the small proportion, the women actually in WHO'S WHO probably have some claim to more distinction than do their male counterparts. Despite the greater odds against them, they made WHO'S WHO."

Science News Letter, February 4, 1950

New Electro-Chemograph gives fast precise analyses



Designed for rapid, accurate polarographic analysis, the new L&N Type E Electro-Chemograph features one piece console design incorporating a built in Speedomax Recorder. The instrument automatically plots diffusion current as a function of voltage and is convenient for both research and industrial process control laboratories.

Further information is available in Folder EM9-90(1). Write to Leeds and Northrup Co., 4977 Stenton Avenue, Philadelphia 44, Pa.

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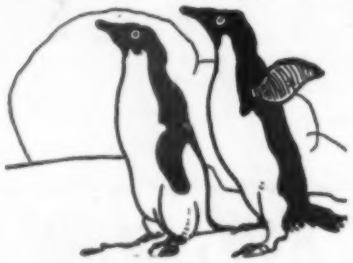
ORNITHOLOGY

NATURE RAMBLINGS



Penguins

➤ THE penguin is a remarkable bird. It has feathers, two legs, wings, and it lays eggs, just like other birds. But eons ago the penguin lost the art of flight and adapted itself to one of the least hospitable environments in the world.

Like the ostrich, the penguin can no longer fly, but both birds have learned how to move swiftly in an unbirdlike way. The ostrich has developed into one of the swiftest runners of all the land animals, and although its short wings are no good for flying, they do help this large and powerful bird to carry its weight more speedily.

The penguin has undergone a different kind of adaptation. Its wings, instead of becoming auxiliaries to rapid transit on land, have become specialized into flippers with which a penguin can achieve swimming speeds rivalling that of seals and porpoises.

Compared to penguins, the amphibious waterfowl like ducks and geese are virtual landlubbers. A penguin swims for considerable distances underwater coming up occasionally for short breathers. Sometimes when in a frolicsome mood, a penguin will leap clear out of the water like a porpoise, curving through the air and diving back into the water.

A penguin with a good head of steam up can leap from the water onto a ledge three or four feet high. Once arrived on land, however, penguins waddle about like creatures out of their element. They walk upright and move awkwardly, although with great dignity.

There are more than a dozen species of penguins, ranging from the larger Emperor and King Penguins down to the foot high Little Penguins.

The largest is the Emperor Penguin which stands about four feet high. It is the most southerly of the family, being the famous antarctic penguin of Admiral Byrd fame. The King Penguin is found farther north in southernmost South America and occasionally in Tasmania and New Zealand. These two penguins share the peculiarity of incubating their eggs while standing up. They lay a single egg which is placed on the foot and covered with a pouch-like flap of skin on the leg.

The Jackass Penguin, so-called from the typical noise that rises from an assembly of this type, is found on the coasts of South Africa. There is one tropical type, the Galapagos Penguin, which uses both flippers and feet to scramble over rocks.

Science News Letter, February 4, 1950

CHEMISTRY

Device Tells Amount Of Oxygen Present

➤ A NEW tool to tell how much oxygen is present in air or in other gases has been developed in Pasadena, Calif.

Based on a device that was used during the war in military and hospital service, the machine is now available to industry. Measurement makes use of the fact that oxygen is strongly attracted to a magnet. Most other common gases are repelled by a magnet.

This magnetic property of oxygen is so great that it is possible to measure extremely small quantities of oxygen present, on the order of a few parts per million.

Credit for the theoretical basis of the instrument goes to Dr. Linus Pauling, head of the department of chemistry at California Institute of Technology. Maker of the new industrial instrument is Arnold O. Beckman, Inc. A. O. Beckman handled development and production of the original Pauling instrument during the war.

Science News Letter, February 4, 1950

ENTOMOLOGY

More Potent Insect Killers Ready for Market

➤ TWO new insect killers are being readied for the commercial market.

The fly killer, dieldrin, which in recent U. S. Public Health Service experiments rated best of 30 insecticides tested, and aldrin which has shown promise against boll weevils, are expected to be launched on the market in March by Julius Hyman & Company.

Other insecticide companies will also release new products as they are developed.

The present hearings on poisonous effects of insect sprays, being conducted by the Food and Drug Administration, will not in any way affect the launching of new insecticides.

The hearings are still taking expert testimony from the Department of Agriculture.

When all the testimony is in, the Food and Drug Administration will issue regulations setting forth the exact amount of spray which can remain on marketed fruit and vegetables. These so-called tolerance residues will govern on all produce in interstate commerce.

The number of insecticides, fungicides, and herbicides which have been developed since the beginning of the war is estimated at 125 or more. Tolerances for all these will have to be set up.

With the continuous development of new sprays like dieldrin and aldrin, the number to be regulated keeps growing.

Partly for this reason and partly because the pace of the hearings has settled down to a slow and leisurely gait, observers think the hearings may easily drag on for a year or more. Meanwhile each new insecticide is carefully tested by the Department of Agriculture and other agencies before the product is put on the market.

Science News Letter, February 4, 1950

INVENTION

Automobile Refrigerator Also Cools the Car

➤ A REFRIGERATOR for installation in the passenger compartment of an automobile for cooling foods and beverages may also be used for cooling the car in hot weather. It will even freeze ice cubes. Patent 2,495,350 was granted to Charles L. Smith, San Diego, Calif., for this invention.

This refrigerator utilizes the conventional refrigeration compressor. The compressor is automatically engaged with the operating mechanism of the car by means of a thermostatically-controlled switch within the freezing compartment. An automobile fan operates as a cooling air circulator for the condenser of the refrigerator unit.

Science News Letter, February 4, 1950

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ALLERGY—Arthur F. Coca and others—*New York Academy of Sciences*, 814 p., illus., paper, $2.50. A group of papers given at a conference in 1947.

THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR THE YEAR 1951—Nautical Almanac Office—*Gov't. Printing Office*, 620 p., illus., $3.25 (Cloth).

DIMENSIONAL ANALYSIS—Nelson F. Murphy—*Virginia Polytechnic Institute*, No. 73, 41 p., illus., paper, 50 cents. A supplementary reference for chemical engineers.

EDUCATONAL EXCHANGES UNDER THE FULBRIGHT ACT—Department of State—*Gov't. Printing Office*, 14 p., Publ. No. 3657, paper, five cents. Brief information on this act—provisions, who may apply, and qualifications needed.

A LABORATORY MANUAL OF VERTEBRATE EMBRYOLOGY—Roberts Rugh—*Burgess*, rev. ed., 234 p., illus., paper, $2.25. For those who already have a general laboratory knowledge of embryology.

NEW DICTIONARY OF AMERICAN POLITICS—Edward Conrad Smith and Arnold John Zurcher, Eds.—*Barnes & Noble*, 437 p., $3.25. A new edition of this standard reference work. Approximately 500 new terms have been added.

NOMENCLATURE OF FUNGI PATHOGENIC TO MAN AND ANIMALS: Names Recommended for Use in Great Britain—The Medical Mycology Committee of the Medical Research Council—*His Majesty's Stationery Office*, Medical Research Council Memorandum No. 23, 12 p., paper, 6 pence net (15 cents.)

THE OBSERVER'S HANDBOOK FOR 1950—C. A. Chant, Ed.—*The Royal Astronomical Society of Canada*, 80 p., illus., paper, 40 cents. The forty-second issue of this publication brought completely up-to-date for 1950.

OPTICS: Physiology of the Eye, Vol. 1—Arthur Linksz—*Grune and Stratton*, 334 p., illus., $7.50. A basic text on optics for the ophthalmologist.

PATENT TACTICS AND LAW—Roger Sherman Hoar—*Ronald*, 3rd ed., 352 p., $7.00. Includes recent changes that have taken place in patent law.

SOME NORTH AMERICAN CHELIFERID PSEUDOSCORPIONS—C. Clayton Hoff—*American Museum of Natural History*, 17 p., illus., paper, 25 cents.

STUDIES OF PERUVIAN BIRDS NO. 55 THE HUMMINGBIRD GENERA DORYFERA, GLAUCIS, THRENETES, AND PHAETHORNIS—John T. Zimmer—*American Museum of Natural History*, 51 p., paper, 25 cents. A brief discussion of the specimens studied.

STUDIES OF PERUVIAN BIRDS. NO. 56 THE GENERA EUTOXERES, CAMPYLOPTERUS, EUPETOMENA, AND FLORISUGA—John T. Zimmer—*American Museum of Natural History*, 14 p., paper, 25 cents.

TABLES OF THE BESSEL FUNCTION OF THE FIRST KIND OF ORDERS SIXTY-FOUR THROUGH SEVENTY-EIGHT—Staff of the Computation Laboratory—*Harvard University Press*, 566 p., $8.00. These tables, which are carried to the tenth decimal place, are computed by the Automatic Sequence Controlled Calculator.

TABLES OF THE FUNCTION $\frac{\sin\phi}{\phi}$ AND OF ITS FIRST ELEVEN DERIVATIVES—The Staff of the Computation Laboratory—*Harvard University Press*, 241 p., $8.00. Tables fundamental in the analysis of a large variety of problems connected with the Fourier transforms of distribution functions. Tables carried to nine decimal places.

TABLES OF THE GENERALIZED EXPONENTIAL-INTEGRAL FUNCTIONS—The Staff of the Computation Laboratory—*Harvard University Press*, 416 p., $8.00. These functions provide solutions of the general wave equation in a case where line sources are immersed in a dissipative medium. Functions carried to the sixth decimal place.

USING CREDIT TO FINANCE FARMHOUSE IMPROVEMENTS—U. S. Department of Agriculture—*Gov't. Printing Office*, Misc. Publ. No. 701, 13 p., illus., paper, ten cents. Written for those who work with farm families.

Science News Letter, February 4, 1950

MINING

Heat Content of Coals Listed in Publication

➤ FOOTNOTE to the coal situation: The heat content of American coals of 27 states, varying from anthracite to lignite, is listed in an information circular just issued by the U. S. Bureau of Mines, available free from its office, 4800 Forbes St., Pittsburgh, Pa.

These average heating values, compiled both by rank and according to the state where mined, are useful in making general comparisons between the different coals, and between coal and other fuels.

The average heat content of all the coals is 13,000 B.T.U. (British thermal units per pound). The average heating value of Pennsylvania anthracite is 13,750 B.T.U. Lignite has the lowest value, 7,000 B.T.U. Low-volatile bituminous has the highest, 14,200 B.T.U.

Science News Letter, February 4, 1950

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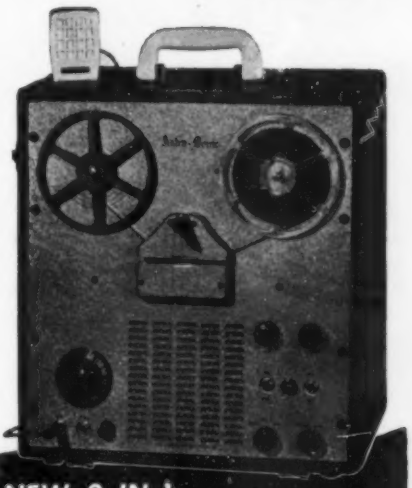

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⚙ *SLICING KNIFE, with a guide rod to enable thin or thick slices to be cut from a loaf of bread or a round of meat, has an extremely thin blade held rigid by the rod. The adjustable rod is attached to the plastic handle of the knife and the end of the blade.*

Science News Letter, February 4, 1950

⚙ *HEADRESTS for bus seats are made of a special plastic material and are permanently installed. They are kept hygienically clean by being wiped off after each trip with a cloth dampened in water or alcohol.*

Science News Letter, February 4, 1950

⚙ *FINGER DRIER, for use after the application of finger-nail polish, is a heating plate containing electric heating elements and an overlying hood under which the fingers are inserted. Provision is made in this recently patented device for free air movement.*

Science News Letter, February 4, 1950

⚙ *SEA-SKATES for the youngster are in reality a jib-and-mainsail-rigged sailboat of the type which includes a narrow raft supported by two watertight, unsinkable pontoons. The pontoons are detachable and may be used as skis to walk on the water.*

Science News Letter, February 4, 1950

⚙ *STRONG TAPE, designed for use in binding heavy packages for shipping, is made of glass fibers and an acetate film. As shown in the picture, a single strand of this new filament tape has tensile strength sufficient to hold up a bunch of steel pipe plus a full-grown man.*

Science News Letter, February 4, 1950

⚙ *PROTECTIVE COATING for aluminum objects from airplanes and houses to small objects is formed by the application by brush or spray of a special chemical preparation. The surface to be protected is first cleaned with a phosphoric acid metal cleaner, then rinsed.*

Science News Letter, February 4, 1950

⚙ *COMPACT SCISSORS SET for the home seamstress includes three scissors, and a plastic holding case which will fit into the sewing cabinet. The case has three pockets, one in front of the other, and the tools included are straight shears, sewing scissors and embroidery scissors.*

Science News Letter, February 4, 1950

⚙ *AUTOMOBILE TIMING LIGHT, which utilizes a neon tube, permits quick and easy testing of ignition timing. Equipped with an extra-length handle to hold the light closer to the timing mark, its neon tube is cradled in a soft, white polyethylene reflector for projecting all the light produced.*

Science News Letter, February 4, 1950

⚙ *ELECTRONIC BLACKBOARD, for use in teaching electronics, includes a cabinet with control buttons on a sloping front and a viewing screen above, 18 by 24 inches in size. It has all the performance requirements for high grade general purpose oscilloscope work.*

Science News Letter, February 4, 1950

Do You Know?

Tobacco plants grown for cigars, cigarettes and pipes belong botanically to the same species but they differ drastically in size, form and aroma.

Cato, the Roman, laid down a number of principles regarding *soil conservation* and preservation of the land about 400 years before the Christain era began.

Chemical polishing is a process by means of which some metals are given a bright, reflective finish without mechanical polishing; it involves a dip treatment.

There is no scientific information to back up the popular belief that one catches a *cold* by sitting in a draft, getting the feet wet, over-exerting or losing sleep.

A possible source of a substance from which the drug *cortisone* can be synthesized for the relief of arthritis sufferers is one of the Strophanthus, a beautiful tropical plant of Africa.

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